

Modular MULTIPLE DISC BRAKE with pressure override (SAE B size)



Service Instructions

NOTE:
This service sheet covers
590 Series "B" Mount
Pressure Override Brakes.

REPAIR KITS

(Refer to page 3 for item numbers)

| Number | Description | Includes |
|------------|------------------------------|--|
| 12-501-052 | Seal Kit | Case Gaskets (10) Oil Seal (6) Back-up Rings (22 & 24) O-rings (2, 8, 23, & 25) Loctite |
| 12-501-068 | Spring Kit | Case Gaskets (10) O-rings (2) Return Springs (12) Springs (20) Loctite |
| 12-501-066 | Bearing Kit | Case Gaskets (10) Oil Seal (6) Bearing (5) O-rings (2) Loctite |
| 12-501-022 | Lining Kit | Case Gaskets (10) Primary Disc (16) Rotor Discs (17) Stator Disc (18) O-rings (2) Loctite |
| 12-501-142 | Lining Kit for 13-590-024 | Case Gaskets (10) Primary Disc (16) Rotor Discs (17) Stator Disc (18) O-rings (2) Loctite |

NOTE: All kits include mounting face gaskets and o-rings.

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ZF Off-Highway Solutions Minnesota Inc.

1911 Lee Boulevard / North Mankato, MN U.S.A. 56003

Tel: +1 507 625 6426 **Fax:** +1 507 625 3212

NOTE

This literature services various models in this brake series. The components shown in Figures 1 and 2 may appear different than what is found in your brake.

DISASSEMBLY

(Refer to Figures 1 and 2)

1. Remove two flat head assembly bolts (1) and o-rings (2). A suitable holding fixture is useful to keep the brake in position.
2. Tap the female end of spline shaft assembly (13) and spring plate (19) with a soft mallet to separate cover (7) from spring plate (19). If sections will not separate, use a screwdriver to carefully pry the sections apart.
3. Remove return plate (11) and two return springs (12).
4. Remove case gasket (10) from cover (7).
5. Remove retaining ring (3) from spline shaft assembly (13).
6. Remove spine shaft assembly (13) from cover (7) by tapping the male end of spline shaft assembly with a soft mallet.
7. Remove piston (9) and o-ring (8) from cover (7).
8. In necessary, remove retaining ring (4) from cover (7) and press out oil seal (6) and bearing (5).
9. Remove four socket head shoulder bolts (15). A suitable holding fixture is useful to hold the brake in position.

⚠ CAUTION

Do not remove shoulder bolts (15) without pressurization of the brake, approximately 20.7 bar (300 PSI), or damage may result.

10. Remove primary disc (16), two rotor discs (17), and stator disc (18).
11. Release pressure before removing two socket head cap screws (14).
12. Remove spring plate (19).
13. Remove case gasket (10) from spring plate (19).
14. Before removing springs (20), record the spring pattern and color for reassembly purposes.
15. Remove piston (21) by carefully applying hydraulic pressure to the brake release port on pressure plate (26).
16. Remove o-rings (23 & 25) and back-up rings (22 & 24) from piston (21). **NOTE: Be careful not to scratch or mar piston (21).**

ASSEMBLY

(Refer to Figures 1 and 2)

LUBRICATE ALL RUBBER COMPONENTS FROM REPAIR KITS WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Use an alkaline wash to clean all parts thoroughly before assembling.
2. If necessary, press oil seal (6) into cover (7) bore until it is flush with the bearing shoulder. Note direction of oil seal (6).
Dry Design Brake: oil seal (6) must be installed with open side facing pilot end of cover.
Wet Design Brake: oil seal (6) must be installed with closed side facing pilot end of cover.
3. If necessary, press bearing (5) into cover (7) bore until it bottoms on the borestep. Install retaining ring (4) in cover (7).

4. Press shaft assembly (13) into bearing (5) until the shaft bottoms on the shaft shoulder. Bearing inner race must be supported during this operation.
5. Install retaining ring (3) on shaft assembly (13).
6. Install o-ring (8) and piston (9) in cover (7).
7. Install back-up rings (22 & 24) on piston (21) on the spring pocket side of piston (21).
8. Install o-rings (23 & 25) on piston (21). Be sure o-rings are flat and all twists are removed. **NOTE: Be careful not to scratch or mar piston (21).**
9. Lubricate piston (21) with clean type fluid used in the system. Carefully press piston (21) into pressure plate (26) until it bottoms out. Be sure piston is rotated so threaded holes are in alignment with the through holes in spring plate (19).
10. Install springs (20) according to spring pattern and color recorded during disassembly. Different colored springs must be alternated. Contact ZF Off-Highway Solutions Minnesota Inc. if you have questions regarding spring pattern.
11. Affix one case gasket (10) to cover (7) and another case gasket (10) to spring plate (19).
12. Place unit on a press. Using fixture, depress and install two socket head cap screws (14). Torque cap screws 54.2 N·m (40 lb·ft). A suitable holding fixture is useful to hold the brake in position. **NOTE: Apply two drops of Loctite #242 to the threads of cap screws (14).**
13. Install rotor discs (17), stator disc (18), and primary disc (16).
14. Align the discs and partially screw in four socket head shoulder bolts (15). Inspect for free movement of the disc stack. Pressurize the brake release port, approximately 20.7 bar (300 PSI), to release the disc stack. Torque shoulder bolts (15) 20.3 N·m (15 lb·ft) and release brake port pressure. A suitable holding fixture is useful to hold brake in position. **NOTE: Apply two drops of Loctite #242 to threads of bolts (15).**
15. Install two return springs (12) in pockets on spring plate (19). Install and align return plate (11) on springs (12).
16. Install cover (7) using two flat head assembly bolts and o-rings (2). Torque assembly bolts 33.9 N·m (25 lb·ft)

⚠ CAUTION

If hydrostatic bench testing is performed on the brake assembly, release pressure should not exceed 69.0 bar (1000 PSI) unless two additional bolts are used for supplemental clamping.

COOLING OIL RECOMMENDATIONS

Oil Type: Mineral base hydraulic oil such as Mobil DTE 24, Citgo A/W 32 or equivalent.

Flow Through Capacity: 3.8-18.9 L/Min. (1.0-5.0 GPM)

Maximum Case Pressure: 1.03 bar (15 PSI)

Sump Oil Volume: Horizontal - 88.7 mL (3 fl oz)

Vertical - Contact ZF Off-Highway Solutions Minnesota Inc.

NOTE: Brakes are shipped dry and customer is responsible for adding proper type and volume of cooling oil.

See page 1 for items included in kits.

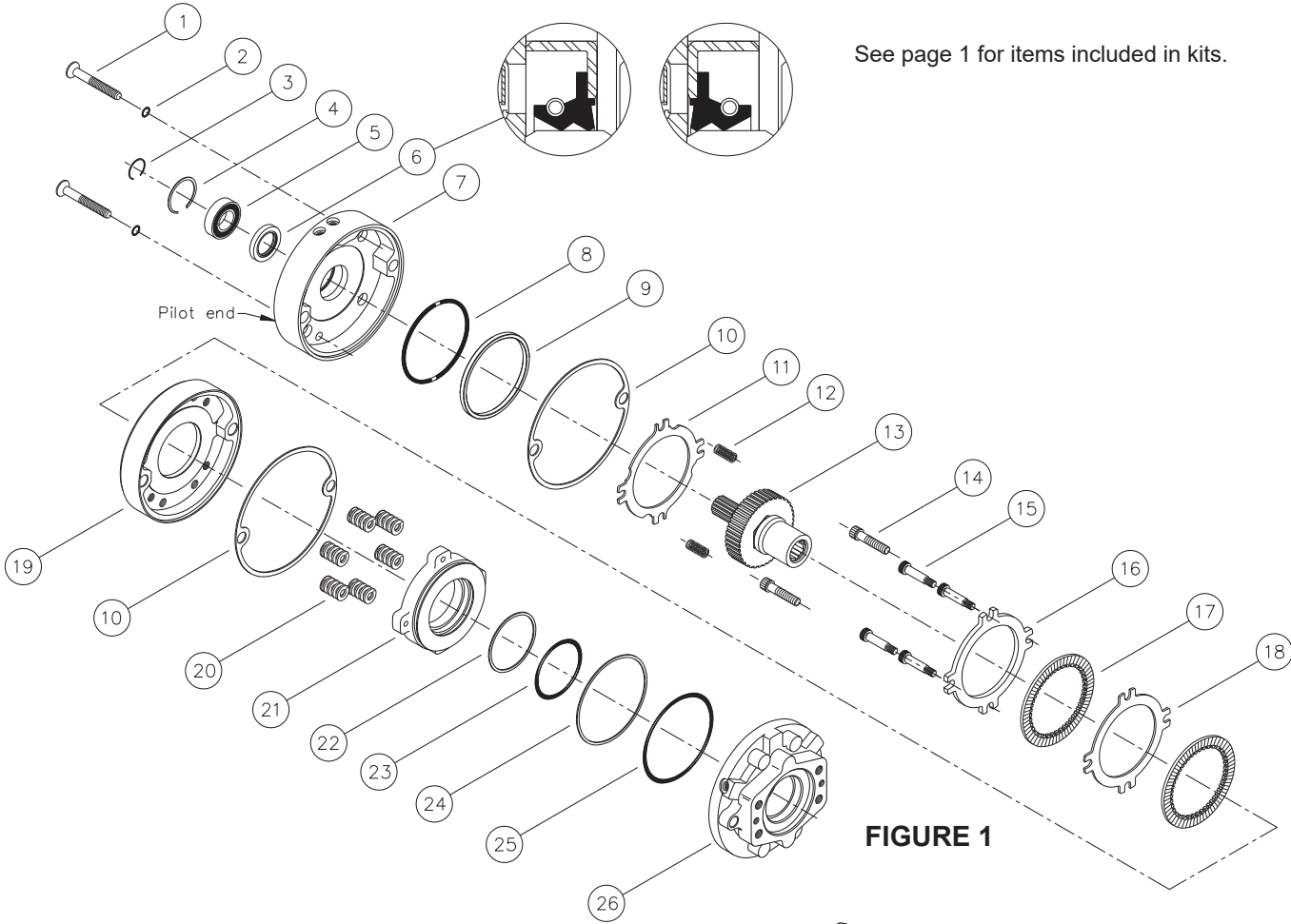


FIGURE 1

Spring Chart

| Model Number | Red Springs (20) | Blue Springs (20) |
|--------------|------------------|-------------------|
| 13-590-004 | 2 | 4 |
| 13-590-006 | 4 | 0 |
| 13-590-008 | 4 | 0 |
| 13-590-010 | 6 | 2 |
| 13-590-012 | 6 | 2 |
| 13-590-014 | 8 | 0 |
| 13-590-020 | 6 | 0 |
| 13-590-022 | 8 | 0 |
| 13-590-024 | 8 | 0 |
| 13-590-030 | 2 | 4 |
| 13-590-032 | 6 | 0 |
| 13-590-034 | 4 | 2 |
| 13-590-036 | 6 | 0 |
| 13-590-038 | 4 | 0 |
| 13-590-040 | 3 | 0 |

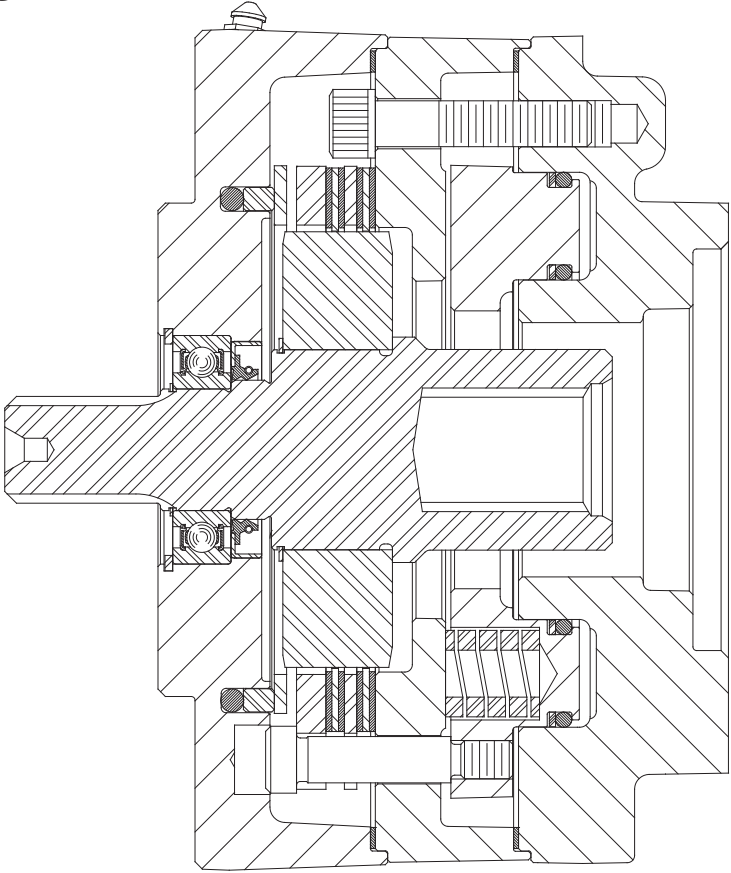


FIGURE 2
(13-590-014 shown)

BLEEDING

1. Install brake in system and connect pressure lines.
2. Bleed the pressure release section of the brake by pressurizing the side inlet port and allowing air to escape from top port. Pressure should not exceed 6.89 bar (100 PSI) during bleeding.
3. Apply sufficient pressure to release brake and check for proper operation in system.

SERVICE DIAGNOSIS

| PROBLEM | CAUSE | EXPLANATION | ACTION |
|-------------------------|---|---|---|
| Brake slips | A. Excessive pressure in hydraulic system | If there is back pressure in the actuation line of the brake, holding torque will be reduced. | Check filters, hose size, restrictions in other hydraulic components. |
| | B. Oil in brake if designed for dry use | Dry linings generate 50% more torque than linings saturated with oil. If the brake has oil in it, check the type of oil. <ol style="list-style-type: none"> 1. Gearbox oil 2. Hydraulic oil | Replace oil seal in brake. Check motor seal. Check piston seals. NOTE: Internal components will need to be inspected, cleaned, and replace as required. |
| | C. Disc plates worn | The thickness of the disc stack sets the torque level. A thin stack reduces torque. | Check disc thickness and contact ZF Off-Highway Solutions Minnesota Inc. |
| | D. Springs broken or have taken permanent set | Broken or set springs can cause reduced torque, a rare occurrence. | Check release pressure and contact ZF Off-Highway Solutions Minnesota Inc. (May need servicing with new spring kit). |
| Brake drags or runs hot | A. Low actuation pressure | The brake should be pressurized to a minimum of 1.38 bar (20 PSI) over the full release pressure under normal operating conditions. Lower pressures will cause the brake to drag thus generating heat. | Attach pressure gauge to bleed port and check pressure with system on. |
| | B. Bearing failure | If the bearing should fail, a large amount of drag can be generated. | Replace the bearing. Refer to kits on page 1. |
| | C. Oil in brake | Excess fill of oil in sump condition through wet brakes can cause the unit to run hot. Also excessive RPM in sump condition. | Drain oil and refill as specified for brake. Switch to flow through cooling. |
| Brake will not release | A. Stuck or clogged valve | Brakes are designed to come on when system pressure drops below stated release pressure. If pressure cannot get to the brake, the brake will not release. | Attach pressure gauge to bleed port. Check for adequate pressure. Replace defective line or component. |
| | B. Bad o-rings | If release piston will not hold pressure, the brake will not release. | Replace o-rings. Refer to kits on page 1. |
| | C. Discs frozen | These brakes are designed for only limited dynamic braking. A severe emergency stop or prolonged reduced release pressure operation may result in this type of damage. | Replace disc stack. Refer to kits on page 1. |